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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/822,686	04/13/2004	Hyo-suk Kim	1572.1262	2992
21171 7590 05/19/2008 STAAS & HALSEY LLP SUITE 700 1201 NEW YORK AVENUE, N.W. WASHINGTON, DC 20005				
EXAMINER				
LOPEZ, FRANK D				
ART UNIT		PAPER NUMBER		
3745				
MAIL DATE		DELIVERY MODE		
05/19/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/822,686

**Applicant(s)**

KIM, HYO-SUK

**Examiner**

F. Daniel Lopez

**Art Unit**

3745

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on March 4, 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☐ Claim(s) 4-6, 8 and 10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 4-6, 8 and 10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)  
Paper No(s)/Mail Date \_\_\_\_\_

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on March 4, 2008 has been entered.

***Response to Amendment***

Applicant's arguments filed March 4, 2008, have been fully considered but they are not deemed to be persuasive.

Applicant's statement that "the Examiner noted that he believed he understood the present invention, however the form of the application created some confusion" is misleading. The Examiner in general understands the workings of a position sensor with coils sensing a position of a magnet and understands that in one position, the cores will be arranged symmetrically around the coils, so that the difference in inductances (i.e. differences in voltages across the coils) will be zero. This symmetrical position can happen twice, once on the way up and once on the way down.

It is also understood that when the upper core (or the lower core) is at the origin of the coils (the center between the 2 coils) that the differences in inductances will not be zero. The amount of inductance from the upper core to the 2 coils will be equal, but the inductance from the lower core will be greater for the lower coil than for the upper coil. Moving the coils up will increase the inductance from the upper core on the upper coil and the inductances of the lower core on both coils; and decrease the inductance of the upper core on the lower coil. There will be a point where these increases and decrease will balance out to get a zero point. Depending on how the cores are located on the piston rod, there may be 2 zero points, 4 zero points or 6 zero points; but not 3 zero points.

The problem with this application is not in these details, but in the details of how the signals are used by the instant system. Changing "vo" to "L1-L2" in paragraphs 23 and 38-43 is not new matter since the voltages from the coils are related to the inductances. But this does not clear up the problem of how the system generates the waveform of fig 8 (i.e. having 3 zero points), or how the sensed time is used to generate a position.

On further review of the interview summary, there appears to be a mistake in the second point of confusion.

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

### ***Specification***

The disclosure is objected to because of the following informalities:

Paragraph 41 states "When the second output Vo...is at the second zero point during the compression stroke...the piston is at a top original position. The top origin position is also passed during an extension stroke. The top origin is a fixed position, and an exact position of the top dead center can be estimated by measuring the amount of time that the piston takes to pass the top origin twice". If the top origin is passed twice, shouldn't there be two second zero points? This is not shown by the graph of fig 8. It is assumed that the top dead center is estimated by integrating the speed of the core over a first half of the time between passing the origin twice. But, how is the speed calculated? This is at the end of the movement of the piston, so the piston is moving relatively slowly, stops, and then reverses direction. There appears to be no way shown to estimate the speed during this time, and therefore, the position of top dead center can't be estimated. If applicant has a different way to estimate the position of top dead center, it needs to be disclosed.

Appropriate correction is required. No new matter can be entered.

***Claim Rejections - 35 USC § 112***

Claims 6, 8 and 10 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claims 6, 8 and 10 all claim a controller which finds a top dead center position of a piston stroke. The specification shows how to measure a time it takes a core to pass a particular point twice. But there is no discussion of how to use the time to estimate the top dead position. As discussed in the objection to the specification, the most likely way to use the time to calculate the top dead center is to integrate the speed of the piston over a first half of the time, but there is no way shown of estimating the speed during this part of the piston movement.

***Claim Rejections - 35 USC § 101***

Claims 4-6, 8 and 10 are rejected under 35 U.S.C. 101 because the claimed invention lacks patentable utility. The sole purpose of the core having two parts is to be able to calculate the top dead center. But, as discussed above, the specification does not show how to calculate the top dead center from just the measured time. Since the purpose of the core having two parts has not been met by the disclosure, it does not have utility.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dan Lopez whose telephone number is (571)-272-4821. The examiner can normally be reached on Monday-Thursday from 6:00 AM -4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Look, can be reached on 571-272-4820. The fax number for this group is 571-273-8300. Any inquiry of a general nature should be directed to the Help Desk, whose telephone number is 1-800-PTO-9199.

Art Unit: 3745

/F. Daniel Lopez/

F. Daniel Lopez  
Primary Examiner  
Art Unit 3745  
May 20, 2008